AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-58. (Cancelled)

59. (Currently amended). A method of fabricating an electronic device using biomolecules [,] comprising ~~the steps of~~:

forming [a] first and second electrodes ~~electrode~~ on a substrate;

~~forming a second electrode on a substrate;~~

extending bridging DNA between said first and second electrodes;

providing at least one RNA complementary to a region of said bridging DNA wherein said at least one RNA and said bridging DNA bond to form at least one R-loop; and

bonding at least one nanoparticle to said DNA within said at least one R-loop. ~~an organic molecule between the first electrode and the second electrode; and inserting at least one nanoparticle into at least one location in the organic molecule.~~

60. (Currently amended). The method according to claim 59, further comprising ~~the step of:~~ arranging an electrically conducting material on said bridging DNA ~~the organic molecule~~.

61. (Currently amended) The method according to claim 59, further comprising ~~the step of:~~ arranging a first linker nucleic acid on said first electrode and a second linker nucleic acid on said second electrode ~~an organic molecule on the first electrode and the second electrode~~.

62. (Canceled).

63. (Currently amended). The method according to claim [62] 61, wherein:

[the] said first and second linker nucleic acid ~~DNA molecules attached to the first electrode and the second electrode~~ are single-stranded, sulfur-terminated, and include from about five to about twenty bases, and said first linker nucleic acid has a first sequence and said second linker nucleic acid has a second sequence different from said first sequence ~~have different sequences of bases~~; and

said bridging DNA comprises a first sticky end having a sequence complementary to and hybridizing with said first linker nucleic acid and a second sticky end complementary to and hybridizing with said second linker nucleic acid.

~~the DNA molecule extending between the first electrode and the second electrode includes sticky ends complementary to and hybridizing with the DNA molecules attached to the first electrode and the second electrode.~~

64. (Currently amended) The method according to claim 62, further comprising ~~the steps of~~:

attaching ~~the DNA molecules to the~~ said first linker to said first electrode and said second linker to the second electrode; and

hybridizing said first sticky end to said first linker and said second sticky end to said second linker.

~~bonding the DNA molecule extending between the first electrode and the second electrode to the DNA molecule attached to the first electrode and the second electrode.~~

65. (Canceled).

66. (Currently amended). The method according to claim 63, wherein ~~the step of depositing an organic molecule on the first electrode and the second electrode comprises the steps of:~~ arranging a first linker nucleic acid on said first electrode and a second linker nucleic acid on said second electrode comprises:

contacting said first electrode with a solution of said first linker;

contacting said second electrode with a solution of said second linker;

bonding said sulfur-termination to said electrode; and

rinsing said solutions from said electrodes.

~~preparing a solution of the DNA molecule to be attached to the first electrode; preparing a solution of the DNA molecule to be attached to the second electrode; placing the first solution on one of the electrodes and the second solution on the other of the electrodes to permit a sulfur group to attach to the electrode; and rinsing off the solution.~~

67. (Currently amended). The method according to claim 66, further comprising ~~the steps of~~:

contacting a region of the substrate between said first and second electrodes with a solution of said bridging DNA; and

aligning said bridging DNA from said first electrode to said second electrode.

~~dispensing a solution of the DNA molecule to extend between the first electrode and the second electrode onto the substrate between the first electrode and the second electrode and aligning between the first electrode and the second electrode the DNA molecule that is to extend between the first electrode and the second electrode.~~

68. (Original). The method according to claim 67, wherein the DNA molecule is aligned by inducing an electric field of a flow field between the two electrodes.

69. (Currently amended). The method according to claim 68, further comprising ~~the steps of~~:

contacting said bridging DNA with a molecule of RNA, wherein said RNA is complementary to a portion of said DNA;

forming an R-loop in said DNA, wherein the DNA in said R-loop includes at least one region pair-bonded with said RNA and at least one non-bonding region free of pair-bonds; and

attaching a nanoparticle to said non-bonding region.

~~forming an R-loop in the DNA molecule extending between the first electrode and the second electrode using an RNA strand complementary to a portion of the DNA molecule extending between the first electrode and the second electrode between the first electrode and the second electrode; and~~

~~attaching the nanoparticle to a portion of the DNA in the R-loop not attached to the RNA molecule.~~

70. (Original). The method according to claim 69, further comprising the step of:

functionalizing the nanoparticle with at least one nucleotide complementary to at least one base of the portion of the DNA loop within the R-loop prior to attaching it to the DNA within the R-loop.

71. (Original). The method according to claim 70, further comprising the step of:

forming a suspension of the nanoparticle and dispensing the suspension of the nanoparticle on the DNA molecule extending between the first electrode and the second electrode.

72. (Currently amended). The method according to claim 71, further comprising the step of:

depositing an electrically conducting material on said bridging DNA ~~the DNA molecule extending between the first electrode and the second electrode~~.

73. (Currently amended). The method according to claim 71, wherein depositing electrically conductive material on said bridging DNA comprises:

immersing said substrate in a silver-containing solution thereby forming silver salts with phosphate groups of said bridging DNA; and

reducing said silver salts to metallic silver.

~~the electrically conducting material is deposited on the DNA molecule extending between the first electrode and the second electrode by immersing the substrate in a silver-containing solution to form a silver salt with phosphate groups of the DNA molecule the method further comprising the step of: reducing the silver salt deposited on the DNA molecule extending between the first electrode and the second electrode to metallic silver.~~

74. (Original). The method according to claim 73, wherein reduction of the silver salt comprises the steps of: exposing the silver salt to a reducing agent.

75. (Original). The method according to claim 74, wherein reduction of the silver salt comprises the steps of: exposing the silver salt to hydroquinone/OH^- followed by hydroquinone/H^+.

76. (Original). The method according to claim 60, further comprising the step of: providing a third electrode on the substrate between the first electrode and the second electrode.

77. (Currently amended). The method according to claim 76, further comprising ~~the steps of~~:

forming capacitive linkages between the electrically conducting material on ~~the organic molecule~~ said bridging DNA and the third electrode.

78. (Currently amended). The method according to claim 76, further comprising ~~the steps of~~:

electrically connecting the electrically conducting material on ~~the organic molecule and the~~ said bridging DNA to said third electrode to form an OR gate.

79. (Currently amended). The method according to claim 60, further comprising:

providing a third electrode and a fourth electrode on the substrate;

extending a second ~~organic molecule~~ bridging DNA between the third electrode and the fourth electrode, and

bonding at least one nanoparticle ~~bonded to the second organic molecule~~ to said second bridging DNA.

80. (Original). The method according to claim 77, further comprising the steps of: providing a fifth electrode on the substrate arranged at least between the first electrode and the second electrode; and providing a sixth electrode on the substrate arranged at least between the third electrode and the fourth electrode.

81. (Original). The method according to claim 79, further comprising the step of: electrically connecting the organic molecules and the electrodes to form an OR gate.

82. (Original) The method according to claim 79, further comprising the step of: electrically connecting one of the first electrode and the second electrode to one of the third electrode and the fourth electrode; and electrically connecting the other of the first electrode and the second electrode to the other of the third electrode and the fourth electrode.

83. (Currently amended). The method according to claim 59, wherein a plurality of nanoparticles are ~~inserted into~~ bonded at a plurality of locations on said bridging DNA ~~the organic molecule~~.

84. (Cancelled)

85. (New) The method according to claim 59 wherein said first and second electrodes comprise gold.

86. (New) The method according to claim 59 wherein said bridging DNA is double stranded.

87. (New) The method according to claim 59 wherein said bridging DNA is λ-DNA.

88. (New) The method according to claim 59 wherein at least one nucleotide is attached to said nanoparticle.

89. (New) The method according to claim 88 wherein said at least one nucleotide is complementary to at least one nucleotide of said bridging DNA molecule within said R-loop.

90. (New) The method according to claim 88 wherein said at least one nucleotide is complementary to at least one nucleotide of the DNA molecule within the R-loop at a location equidistant from the first electrode and the second electrode.

91. (New) The method according to claim 61 wherein said first and second linker nucleic acids are selected from the group consisting of RNA and DNA.

92. (New) The method according to claim 61 wherein said first and second linker nucleic acids are sulfur terminated and single stranded.

93. (New) The method according to claim 61 wherein said first linker nucleic acid has a different sequence than said second linker nucleic acid.

94. (New) The method according to claim 61 wherein each of said linker nucleic acids consists of from about five to about 100 base pairs.

95. (New) The method according to claim 79 wherein said third electrode has a width of about 100 nm to about 5000 nm.

96. (New) The method according to claim 79 wherein said third electrode has a width of less than 100 nm.

97. (New) The method according to claim 79 wherein said third electrode is perpendicular to said bridging DNA.

98. (New) The method according to claim 79 wherein said bridging DNA contacts said third electrode.

99. (New) The method according to claim 59 wherein said first and second electrodes are separated by a distance of about lμm to about 100μm.

100. (New) The method according to claim 59 wherein the first electrode and the second electrode are made of an oxide-free material.

101. (New) The method according to claim 59 wherein the first electrode and the second electrode terminate in sharp tips that face each other.

102. (New) The method according to claim 59 wherein the substrate comprises a glass.

103. (New) The method according to claim 79, wherein said fourth electrode is positioned between the first electrode and the second electrode.

104. (New) The method according to claim 103 wherein the fourth electrode has a width of about 100 nm to about 5000 nm.

105. (New) The method according to claim 103 wherein the fourth electrode has a width of less than 100 nm.

106. (New) The method according to claim 103 wherein the fourth electrode is perpendicular to said bridging DNA.

107. (New) The method according to claim 103 wherein said bridging DNA contacts the third electrode and the fourth electrode.

108. (New) The method according to claim 76, further comprising electrically connecting the electrically conducting material on said bridging DNA to said third electrode to form an AND gate

109. (New) The method according to claim 79 further comprising:

providing a fifth electrode on the substrate arranged at least between the first electrode and the second electrode; and

providing a sixth electrode on the substrate arranged at least between the third electrode and the fourth electrode.

110. (New) The method according to claim 109 wherein said bridging DNA contact the fifth electrode and the sixth electrode; and the electrodes and the DNA molecules are electrically connected together to form an OR gate.

111. (New). The structure according to claim 109, wherein one of the first electrode and the second electrode is electrically connected to one of the third electrode and the fourth electrode and the other of the first electrode and the second electrode is electrically connected to the other of the third electrode and the fourth electrode.

112. (New) The method according to claim 59 further comprising: a plurality of nanoparticles bonded to the bridging DNA.